Bayes factors using pseudo priors

Bayes factors using the Carlin and Chib method. For full description see Page 47 of Classic BUGS examples Vol 2.

```
model{
# standardise data
   for(i in 1:N){
      Ys[i] <- (Y[i] - mean(Y[])) / sd(Y[])
      xs[i] <- (x[i] - mean(x[])) / sd(x[])
      zs[i] <- (z[i] - mean(z[])) / sd(z[])
   }

# model node
   j  ~ dcat(p[])
   p[1] <- 0.9995 p[2] <- 1 - p[1] # use for joint modelling
   #   p[1] <- 1 p[2] <- 0  # include for estimating Model 1
   #   p[1] <- 0  p[2] <-1  # include for estimating Model 2
   pM2 <- step(j - 1.5)

# model structure
   for(i in 1 : N){
      mu[1, i] <- alpha + beta * xs[i]
      mu[2, i] <- gamma + delta*zs[i]
      Ys[i]    ~ dnorm(mu[j, i], tau[j])
   }

# Model 1
   alpha  ~ dnorm(mu.alpha[j], tau.alpha[j])
   beta   ~ dnorm(mu.beta[j], tau.beta[j])
   tau[1] ~ dgamma(r1[j], l1[j])
   # estimation priors
   mu.alpha[1]<- 0 tau.alpha[1] <- 1.0E-6
   mu.beta[1] <- 0 tau.beta[1]  <- 1.0E-4
   r1[1]      <- 0.0001   l1[1] <- 0.0001
   # pseudo-priors
   mu.alpha[2]<- 0 tau.alpha[2] <- 256
   mu.beta[2] <- 1 tau.beta[2]  <- 256
   r1[2]      <- 30       l1[2] <- 4.5

# Model 2
```

```
    gamma  ~ dnorm(mu.gamma[j], tau.gamma[j])
    delta  ~ dnorm(mu.delta[j], tau.delta[j])
    tau[2] ~ dgamma(r2[j], l2[j])
    # pseudo-priors
    mu.gamma[1] <- 0  tau.gamma[1] <- 400
    mu.delta[1] <- 1  tau.delta[1] <- 400
    r2[1]       <- 46       l2[1] <- 4.5
    # estimation priors
    mu.gamma[2] <- 0 tau.gamma[2] <- 1.0E-6
    mu.delta[2] <- 0 tau.delta[2] <- 1.0E-4
    r2[2]       <- 0.0001   l2[2] <- 0.0001
}
```

Data (click to open)

Inits (click to open)

Results

	mean	sd	MC_error	val2.5pc	median	val97.5pc	start	sample
pM2	0.623	0.4846	0.007682	0.0	1.0	1.0	1001	10000

corresponding to a Bayes factor of 0.623 / 0.377 x 0.9995 / 0.0005 = 3308.